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10/675,289	09/29/2003	William F. Micka	TUC920030045US1	5437
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EXAMINER				
TIMBLIN, ROBERT M				
ART UNIT		PAPER NUMBER		
2167				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/675,289

Applicant(s)

MICKA ET AL.

Examiner

ROBERT TIMBLIN

Art Unit

2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This office action corresponds to application 10/675,289 filed 9/29/2003.

Response to Amendment

The Examiner acknowledges and enters the amendments made to claims 1, 7, and 13. Accordingly, claims 1-18 have remain pending prosecution.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beal et al. ("Beal" hereinafter) (US 5,155,845) in view of Tan et al. ("Tan" hereinafter) (US 2003/0126347 A1) and further in view of Beardsley et al. ('Beardsley' hereinafter) (U.S. Patent 6,061,750).

With respect to claim 1, and similar claims 7 and 13, Beal discloses A method to coordinate interconnected information storage and retrieval systems, wherein each of the information and storage systems is capable of communicating with one or more host computers, comprising the steps of:

'providing a host computer' (drawing 101).

providing a three (col. 4 line 51-56 and figure 12; e.g. “a number of additional DSCs...may be employed”) information storage and retrieval systems (figure 1 shows at least two storage systems as DSCs 105, 107), wherein each information storage and retrieval system comprises and at least two hard disk arrays (109, 111), wherein each hard disk array (109, 111) comprises eight disk drives (col. 4 line 56 and drawing references 109-*n* and 111-*n*), wherein each of said plurality of three (col. 4 line 51-56 and figure 12; e.g. “a number of additional DSCs...may be employed”) information storage and retrieval systems (105, 107) is interconnected (i.e. figures 1-4 and col. 5 line 50-53) illustrate the interconnectivity with the other systems) with each of the other information storage and retrieval systems (drawing reference 106, 110, 108), via a first communication link (col. 4 line 51-56), and where each of said three (col. 4 line 51-56 and figure 12; e.g. “a number of additional DSCs...may be employed”) information storage and retrieval systems (figure 1 shows at least two storage systems as DSCs 105, 107) is interconnected with said host computer (drawing reference 101, 102, 104 and figures 1-2), via a second communication link (figure 3 drawing reference 104 and 124), and wherein each of said information storage and retrieval systems is interconnected with a different remote storage location’ (col. 8 line 25-39; col. 14, line 21-38; figs. 1-4).

‘providing six controllers (105, 107, 113 and 112), wherein two controllers are disposed in each of said three (col. 4 line 51-56 and figure 12; e.g. “a number of additional DSCs...may be employed”) information storage and retrieval systems (105 and 112 are both controllers in the same storage system).’ A DASD subsystem comprises a plurality of data storage control units (DSC) (col. 2, lines 60-67). A single DSC can be connected to one or more disk controllers (col. 9, line 53-55).

Beal fails to explicitly describe designating one of said plurality of six controllers as a master controller and the remaining controllers as target controllers, wherein said master controller receives one or more commands from said host computer and then issues one or more master controller commands to each of said target controllers; generating one or more master controller commands by said master controller; providing said one or more master controller commands to each of said target controllers, wherein said one or more master controller commands cause said target controllers to adjust the flow of data into and out of each of said one or more information storage and retrieval systems.

Beal also fails to explicitly disclose wherein each of said plurality of controllers comprises logic enabling that controller to function as a master controller, or as a target controller, or as both a master and a target controller.

Tan, however teaches designating one of said plurality of controllers (figure1) as a master controller (active controller; 0023) and the remaining controllers as target controllers (0029), wherein said master controller (active controller; 0023) receives one or more commands from said host computer (0023; “all read and write transfers over the host PCI bus are performed as burst transfers...the bus master determines the length of the burst and 0029) and then issues one or more master controller commands to each of said target controllers (0030); identifying the standby controller as a target device, 0023);

generating one or more master controller commands by said master controller (as the commands disclosed in 0025, 0029 and 0032);

providing said one or more master controller commands to each of said target controllers, wherein said one or more master controller commands cause said target controllers to adjust the

flow of data into and out of each of said one or more information storage and retrieval systems (0023, 0030 and 0032) discuss commands from the active controller to the standby controller).

Tan also teaches wherein each of said plurality of controllers (130, 150) comprises logic ([0024], second column, first 2 lines) enabling that controller to function as a master controller, or as a target controller ([0024] master and target devices), or as both a master and a target controller ([0024] both controllers 130, and 150 may be configured to be both master and target devices) for designating a device as master or target.

In the same field of endeavor, (i.e. providing data redundancy), it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references because the teachings of Tan would have given Beal's invention inter-controller communication to facilitate communication between the controllers. Such teachings would provide the benefit of an improved controller redundancy (Tan at paragraph 0010). Tan also would have given Beal a way to condition to DSC 105 and 107 to both act as master controllers (as disclosed by Beal in col. 31 line 67-col. 32 line 2) or act as a secondary or primary device (disclosed by Beal in col. 14 line 8-14).

Furthermore, although Beal's storage systems may include one or more controllers, there remains a need for improved communication between them for improved data redundancy.

The combination of Beal and Tan do not expressly teach wherein each information storage and retrieval system comprises a plurality of I/O adapters, two data caches interconnected to said plurality of I/O adapters, a device adaptor interconnected to said plurality of I/O adapters and to said data caches, and at least two hard disk arrays interconnected with said device adapter.

Beardsley, however, teaches wherein each information storage and retrieval system comprises a plurality of I/O adapters (see figure 3; e.g. the connections to hosts 34 and connections to DASDS A-B describe at least a plurality of I/O adaptors as well as bridges 24a-b also serve as a adaptors), two data caches (figure 3, drawing references 16,18) interconnected to said plurality of I/O adapters (i.e. host and DASDS connections), a device adaptor (see figure 3, drawing references 20, 22) interconnected to said plurality of I/O adapters (i.e. host and DASDS connections) and to said data caches 16-18), and at least two hard disk arrays (figure 3, drawing references 4, 6) interconnected with said device adaptor (see figure 3, drawing references 20, 22) to provide communication within a storage system.

In the same field of endeavor, (i.e. data storage), it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references because Beardsley would have given the combination of Beal and Tan an efficient hardware configuration including a device adaptor to communicate to DASDS in case of a failure.

The limitations of claims 7 and 13 have been rejected for the same reasons as this claim for being essentially similar to claim 1. Furthermore, With respect to claims 7 and 13, Beal teaches wherein each of said plurality of information storage (105, 107) and retrieval systems comprises active controllers as 105 and 112 are both controllers in the same storage system.

With respect to claims 2, 8, and 14, Tan discloses 'one or more master controller commands causing each of said target controllers to stop accepting write operations from said one or more host computers' (0025 and 0029).

With respect to claims 3, 9, and 15, Tan discloses 'each of said target controllers to form one or more consistency groups' as maintaining consistency groups (0007).

With respect to claims 4, 10, and 16, Tan discloses 'causing each of said target controllers to stop providing data to said one or more remote storage locations' as initiating and terminating data transfers (0029).

With respect to claims 5, 11, and 17, Beal discloses 'providing a host computer policy command to said master controller' as a host specifying a multiple copy service (col. 3 line 10-13).

'providing at a first time by said master controller to each target controller one or more first master controller commands' as a sequence of commands (col. 19, lines 34-50).

'providing at a second time by said master controller to each target controller one or more second master controller commands' as a sequence of commands (col. 19, lines 34-50).

With respect to claims 6, 12, and 18, Beal discloses 'providing status information to said master controller by each target controller' as the host is notified of the completion of the execution of the write command (col. 3, lines 30-42).

Response to Arguments

Applicant's arguments filed 11/21/2008 have been fully considered but they are not persuasive.

Applicant substantially argues that the Beal, Tan, and Beardsley references do not teach the claims as presently amended. In particular, Applicant argues substantially argues that the references do not teach or suggest use of the specific number of components as claimed (i.e. three information storage and retrieval systems, two hard disk arrays, eight disk drives, first/second communication link, six controllers) as well as the amended feature of commands received by the master controller from the host and then commands to each of the target controllers from the master. Examiner respectfully disagrees given the citations addressing these individual claimed features as found in the rejection above.

Furthermore, Examiner notes that Beal mentions having a plurality of the recited components (e.g. storage and retrieval systems, controllers, disk drives, etc) and thus is not precluded from teaching the specific number of components. For a reasonable interpretation, Beal teaches a range of 1-to-any desirable number (i.e. a plurality) and thus the specific number of components in the present invention falls within that range.

Accordingly the arguments are found unpersuasive as the claimed limitations remain to be taught by the cited prior art.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert M. Timblin whose telephone number is 571-272-5627. The examiner can normally be reached on M-Th 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ROBERT TIMBLIN/

Examiner, Art Unit 2167

/John R. Cottingham/

Supervisory Patent Examiner, Art Unit 2167